CHAPTER 8 Wildlife

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Native wildlife is a natural and integral component of the Lake Tahoe ecosystem. At least 289 terrestrial and semi-terrestrial vertebrates occur in the Lake Tahoe Basin as residents or regular visitors (Murphy and Knopp 2000), including 217 birds, 59 mammals, 5 amphibians, and 8 reptiles. An additional 57 terrestrial species have been recorded in the Basin as accidental visitors or as species that no longer occur in the Basin (Murphy and Knopp 2000). Consequently, the Lake Tahoe Basin provides environmental conditions and habitats favorable to a diverse array of species.

In general, wildlife requires specific habitat elements such as food, cover, water, and space to survive and reproduce. The availability of essential habitat elements is dynamic and varies in time and space, and the suitability of a habitat or a combination of habitats is dependent on a species' requirements. Understanding the relationship between wildlife and habitat, the processes that create habitat, and the life history requirements of a wide diversity of wildlife species is at the heart of sound wildlife planning and management. In addition to physical habitat attributes, factors such as predators, parasites, competitors, and disease can cause habitat degradation. Human disturbance such as heavy recreational use can make an area unsuitable for occupancy by many wildlife species. Thus, the evaluation of habitat suitability must include both the direct (e.g., physical structure, food) and indirect (e.g., disturbance, predation) factors impacting wildlife.

Recognizing the importance of wildlife to environmental quality in the Lake Tahoe Basin, the *TRPA Bi-State Compact* established the framework from which the *TRPA Regional Plan* and the adopted Environmental Threshold Carrying Capacities (Threshold Standards) for wildlife were created. The Goals and Policies (TRPA 1986) and the Code of Ordinances and Rules of Procedure (TRPA 1987a) provide Policy Statements for the maintenance of Wildlife Threshold Standards.

According to the Wildlife Sub-Element of the Goals and Policies, there are two goals and five Policy Statements relative to maintaining wildlife resources. The goals are:

1. Maintain suitable habitat for all indigenous species of wildlife without preference to game or non-game species through maintenance of habitat diversity; and
2. Preserve, enhance, and, where feasible, expand habitats essential for threatened, endangered, rare, or sensitive species found in the Basin.

The five policies include:

1. Considering and mitigating project impacts to wildlife
2. Protecting riparian vegetation
3. Forbidding the release of non-native species
4. Controlling and containing domestic animals
5. Protecting sensitive species and buffering them against conflicting land uses

The TRPA *Code of Ordinances* provides more specific language pertaining to the protection of sensitive wildlife species and their habitats.

TRPA Threshold Standards for wildlife resources direct the agency to improve wetland and riparian habitat, and sustain Special Interest Species populations at or above Threshold Standard levels (Table 8-1). There are two Indicator Reporting Categories adopted in TRPA Resolution 82-11 for the Wildlife Threshold Category, including: 1) Special Interest Species and 2) Habitats of Special Significance. TRPA has adopted 16 Threshold Standards for the two Indicator Reporting Categories. The following summarizes standards by Indicator Reporting Category for the Wildlife Threshold Category.

1. **Special Interest Species** - identifies seven Numerical Standards and eight Management Standards related to six species (Bald Eagle, Osprey, Golden Eagle, Peregrine Falcon, Northern Goshawk and deer) and one group of species ("waterfowl", Table 8-1). The Numerical Standards establish a minimum number of "populations sites" that must be maintained, while the Management Standard establishes "disturbance" (free) buffer zones for each species or species group that are to be managed consistent with the habitat requirements of the associated species. The evaluation of the eight Disturbance Zone Management Standards is summarized in one indicator summary below.

2. **Habitats of Special Significance** – Establishes one Management Standard that directs the agency to conserve and expand riparian habitats for the benefit of species associated with these areas (Table 8-1 on next page).

Table 8-1: *Summary of Wildlife Indicator Reporting Categories and adopted TRPA Threshold Standards by type and indicators used to assess adopted standards.*

Indicator Reporting Category	Standard	Type of Standard	Indicator
Special Interest Species	Maintain a minimum number of population sites for each of eight special status species or species assemblage. The minimum number of population sites is as follows: • Goshawk (12 population sites) • Osprey (4 population sites) • Bald Eagle Wintering (2 population sites) • Bald Eagle Nesting (1 population site) • Golden Eagle (4 population sites) • Peregrine (2 population sites) • Waterfowl (18 population sites)	Numerical Standard	The number of occupied population sites that are maintained based on best available monitoring data.
	Maintain disturbance zones in which activities that would disturb special status species are regulated. Disturbance zones apply to mapped areas or specific distances around population sites. The size of disturbance zones for each Special Interest Species are as follows: • Goshawk (0.5 mile radius around nest sites) • Osprey (0.25 mile radius around nest sites) • Bald Eagle Wintering (mapped areas) • Bald Eagle Nesting (0.5 mile radius around nest sites) • Golden Eagle (0.25 mile radius around nest sites) • Peregrine (0.25 mile radius around nest sites) • Waterfowl (mapped areas) • Deer (mapped areas corresponding to "meadows")	Management Standard	Evidence of TRPA support for Management Standard.
Habitats of Special Significance	A nondegradation standard shall apply to significant wildlife habitat consisting of deciduous trees, wetlands, and meadows while providing for opportunities to increase the acreage of such riparian associations.	Management Standard	Evidence of TRPA support for Management Standard.

Special Interest Species and Habitats of Special Significance

The foundation of the Special Interest Species Indicator Reporting Category is the protection of native wildlife species that were identified in 1982 as aesthetically pleasing to residents and visitors, and/or are especially vulnerable to extirpation (TRPA 1982a). The Threshold Standards for the Special Interest Species Indicator Reporting Category has both numerical and management components to the standard as it identifies a minimum numbers of population sites for each species (or group of species, such as waterfowl) that must be maintained, and an area around each population sites that must be appropriately managed to protect the species or species group. Unfortunately, the term "population site" has not been sufficiently defined by TRPA to guide Threshold Standard attainment determinations. Consequently, the approach to determine "attainment" of the standard can be interpreted in different ways. For example, it could be interpreted that the agency only needs to maintain the areas that were originally mapped for the species or species group to achieve the Threshold Standard. In this case, TRPA could legitimately make the determination that those sites (plus additional sites) have been protected because they still exist as such, and TRPA limits the types of activities that occur in those sites. Alternatively, as approached in previous Threshold Evaluations (and in this one), indicators, such as anthropogenic disturbance, have been used to judge the attainment status of the standard. This situation needs to be rectified through amendment to the adopted Threshold Standard, to clarify approaches for evaluating "attainment" status.

The management component of the Threshold Standard that relates to providing disturbance-free buffer zones for Special Interest Species was evaluated using qualitative criteria. To achieve this standard, activities that could disturb special status species must be limited within the disturbance zones. The status of the Management Standard was evaluated based on whether TRPA and other agencies had provisions in place that would achieve the objectives of the Management Standard. The evaluation indicated that TRPA, in partnership with other agencies, has protected disturbance buffer areas, and has implemented policies, regulations and/or management actions consistent with the Management Standard. An indicator summary below provides more details on the status of the Special Interest Species Management Standard.

The basis for the Habitats of Special Significance Management Standard is to protect riparian habitats (meadows, marshes, and deciduous riparian areas) because they provide habitat for the most diverse assemblage of wildlife species in the Region according to TRPA (1982a). A qualitative assessment of policies and management actions found that the Regional Plan ordinances related to stream zone protection and restoration actions have been implemented, and that the agency has and continues to honor the intent of the Management Standard.

The status and trends of eight indicators related to six Numerical Standards were evaluated to characterize the overall status and trend of the Special Interest Species Indicator Reporting Category, including: Northern Goshawk, Osprey, annual winter Bald Eagle survey, nesting Bald Eagle, Golden Eagle, Peregrine Falcon, waterfowl, and spring and fall deer counts. Numeric targets have not been established for the annual winter Bald Eagle survey or deer surveys (there are no adopted targets for the number of individual Bald Eagles counted or individual deer counted; only adopted targets for the minimum number of sites that need to be maintained for wintering Bald Eagle and to protect meadow habitats). These indicators provide information relative to the wintering Bald Eagle and deer populations, and were not used to determine their status relative to adopted Threshold Standards. For the remaining six indicators, nesting Bald Eagle and Peregrine Falcon were determined to be "at or somewhat better than target," Osprey was "considerably better than target," and waterfowl and Northern Goshawk were determined to be "somewhat below target." There was insufficient

population-related information available to determine the status of the indicator for Golden Eagle, although it was determined that the sites originally identified for their protection remain intact and secure from disturbance. Overall, when indicators were aggregated, the status of Special Interest Species was determined to be "at or better than target," and the overall trend showed that 6 of the 8 indicators showed "moderate improvement." Overall confidence in the determination of status and trend is determined to be "moderate" (Figure 8-1). Following Figure 8-1 are indicator summaries that provide a more detailed evaluation of each indicator relative to adopted standards.

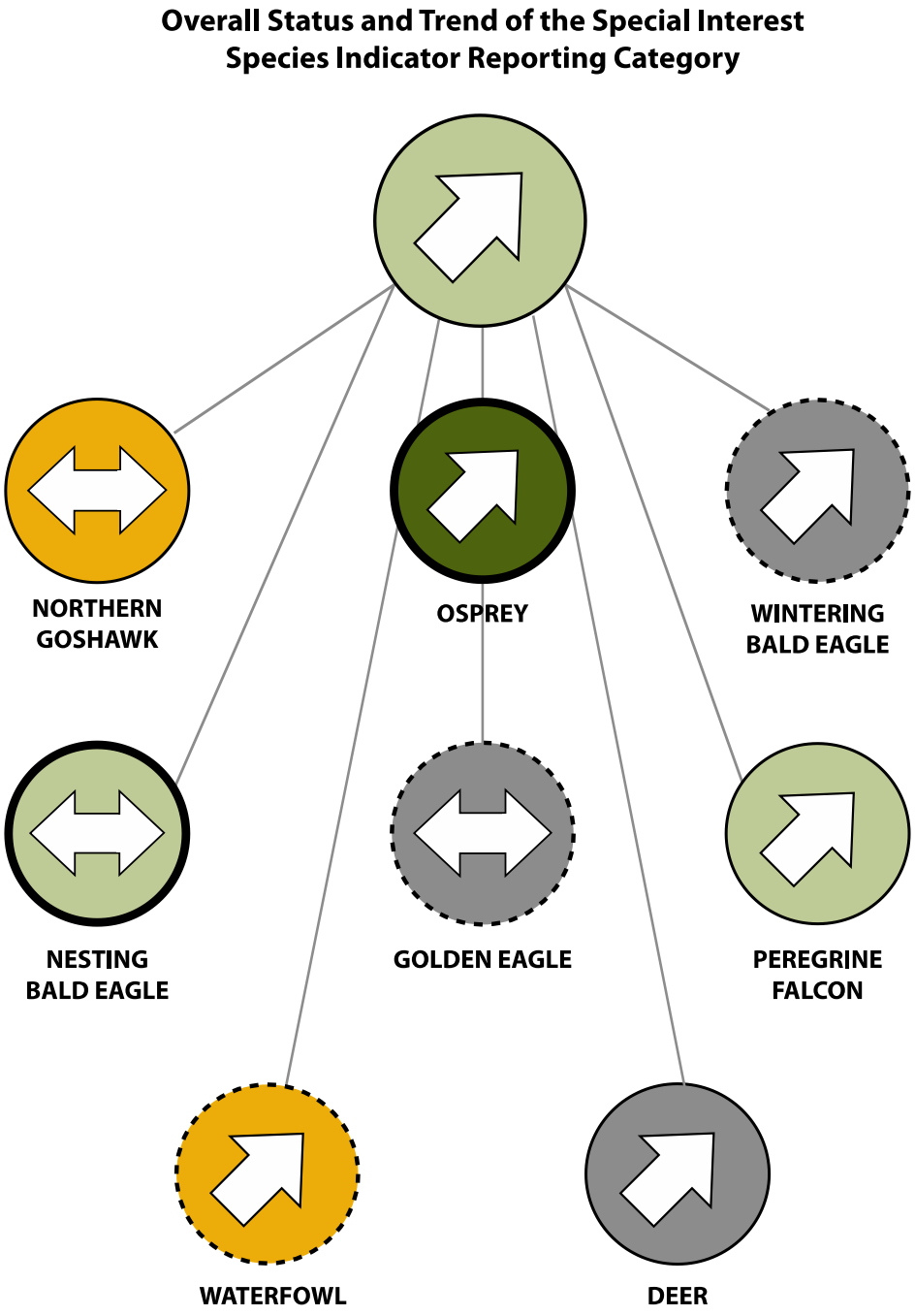
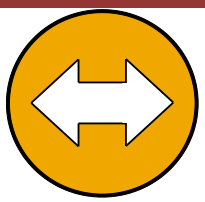


Figure 8-1. *Reporting icons for the eight indicators evaluated in the Special Interest Species Indicator Reporting Category. Results from each of the eight indicators (bottom) were evaluated and aggregated to characterize the overall status of the Special Interest Species Indicator Reporting Category (top).*

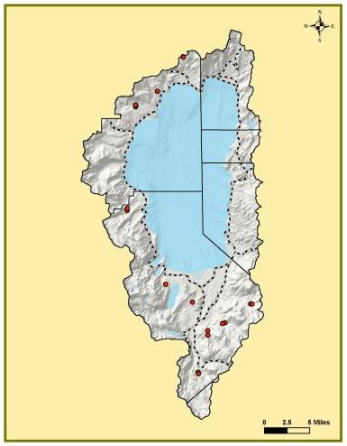
Special Interest Species: **Northern Goshawk**

Reporting Icon



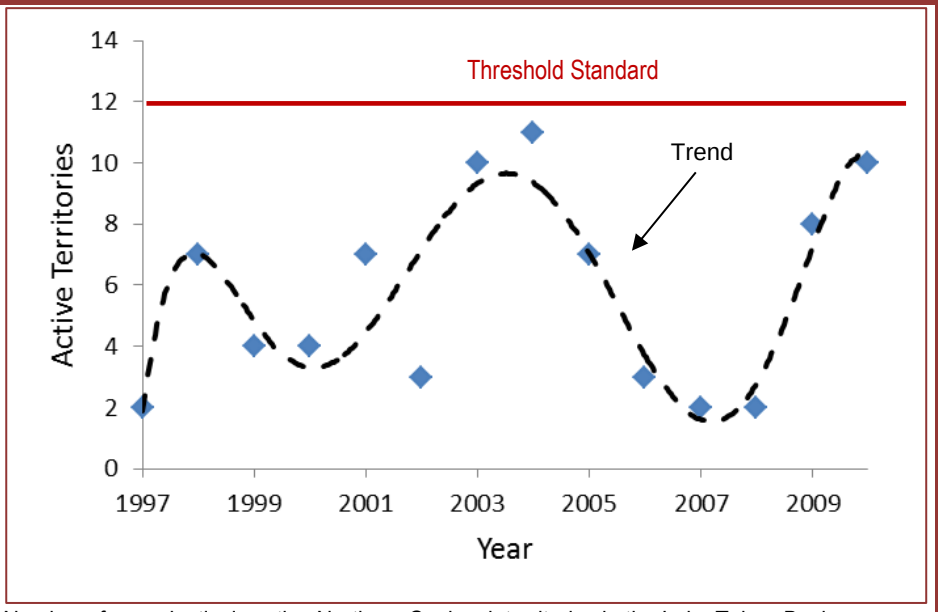
NORTHERN GOSHAWK
Status: **Somewhat Worse than Target**
Trend: **Little or No Change**
Confidence: **Moderate**

Map



Approximate locations of known reproductively active Northern Goshawk territories from 2006 to 2010. Source: US Forest Service- LTBMU

Trend



Number of reproductively active Northern Goshawk territories in the Lake Tahoe Basin (1997 to 2010) relative to TRPA's Threshold Standard of 12 population sites. Dashed lined indicates a cyclic trend in reproductively active territories. Source: US Forest Service - LTBMU.

Data Evaluation and Interpretation

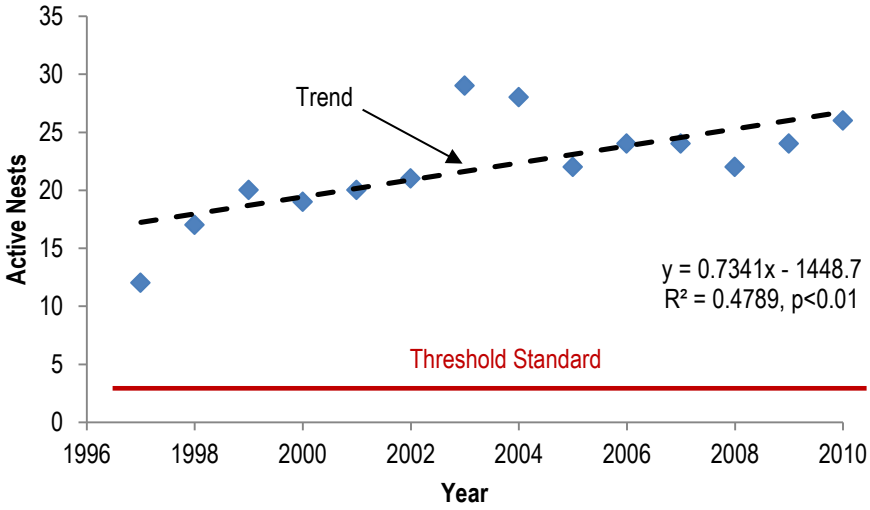
Relevance – The Northern Goshawk (*Accipiter gentilis)* is particularly sensitive to human disturbances or habitat alterations because it is a top predator, requires large areas and old growth forest, and has low breeding densities (Squires and Kennedy 2006). Goshawks have special designations by TRPA, the states of California and Nevada, and the U.S. Forest Service, providing them with increased levels of protection. The number of reproductively active territories is an indicator of the stability of the goshawk population in the Tahoe Basin.
TRPA Threshold Category - Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – Maintain 12 Northern Goshawk population sites
Type of Standard - Numerical
Indicator (Unit of Measure) – The total number of reproductively active goshawk territories recorded each year.
Status - Over the past 14 years (1997 – 2010) the Threshold Standard of 12 population sites, defined as reproductively active territories, has not been met and the Threshold Standard is not in attainment. The average number of reproductively active territories over the last 14 years and over the 5 years since the last evaluation was 5.7 and 5, respectively, or approximately 45% of the Threshold Standard. The peaks of the previous two cyclical changes in numbers of goshawk nests were near the Threshold Standard. Overall, the indicator is slightly below the standard when the Threshold Standard is interpreted in this way. If the Threshold Standard were interpreted to simply protect 12 sites, the Region would be determined to be considerably better than target because more than 30 territories have been mapped since the adopted Threshold Standard and have been managed according to protective measures outlined in the TRPA Regional Plan.
Trend - Over the long-term (1997 – 2010), the number of reproductively active territories has varied between 2 and 11/year. The long-term trend appears to exhibit cyclical variations, although this cyclical trend could be partially influenced by changes in survey effort. The peak of observed cycles appears to have increased to near the Threshold Standard over the time period for which data exists. However, the low point of the cycles has appeared to decrease over the same time period, indicating greater variability in the abundance of goshawk nests rather than an increasing or decreasing trend. The trend in the number of sites protected has increased cumulatively since the Threshold Standard was adopted in 1982.
Confidence - There is a high degree of confidence in the quality of the data collected. However, data was often collected to assess the potential impacts of specific proposed projects rather than to evaluate regional status and trends. This reduces confidence in evaluating the indicator status relative to the Threshold Standard with the available information. In 2009, a ten-year goshawk population monitoring effort was initiated that, if fully funded, will improve the future confidence in interpreting regional status and trends (Slauson and Zielinski 2008). Given the variability of the data and the short time period of the data relative to length of each cyclical fluctuation in nest numbers, there is only a moderate level of confidence in the lack of trend. Therefore, there is a medium level of confidence in the status and trend.
Interim Target – Achieve Threshold Standard of 12 population sites (reproductively active territories) during the peak of the next cyclical increase in the number of goshawk nests.
Interim Target – Based on the cyclic nature of the trend, it is estimated that there will be between 4 and 8 reproductively active territories by the next major evaluation period in 2016
Target Attainment Date – Historic data indicates the Region may never achieve this Threshold Standard as interpreted based on the number of reproductively active territories indicator. When the Threshold Standard is interpreted to protect sites currently or previously occupied by northern goshawk, the Region has attained the Threshold Standard.
Human and Environmental Drivers - Goshawk populations can exhibit cyclical changes in reproductive success in response to changes in the abundance of prey populations (Doyle and Smith 1994; Salafsky et al. 2005; Wiens et al. 2006). In the Tahoe area, goshawk reproduction can vary in response to weather and pine cone production, which provides food for prey species (Keane et al. 2006). Goshawks are also dependent on old growth forest types. These habitats can be impacted by forestry activities, large fires, and roads and other human activities (Squires and Kennedy 2006; Morrison et al. 2011).
Monitoring Approach - Data are collected by the US Forest Service, CA Department of Parks and Recreation, and NV Department of Wildlife following well-accepted protocols. These data are augmented by reports from private or non-profit organizations and qualified individuals (USDA 2009e; USDA 2011d).
Monitoring Partners - US Forest Service, CA Department of Parks and Recreation, NV Department of Wildlife, and numerous volunteers and cooperating organizations.
Programs and Actions Implemented to Improve Conditions – TRPA does not permit projects that would impact nesting goshawks or their habitat within 0.5-mile buffer zones surrounding known nests. Additional measures that provide indirect benefits to nesting goshawks are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws.

Effectiveness of Programs and Actions – The existing programs have provided protection for nesting goshawks, although the buffer is based on a simple radius around a nest site. This simple buffer may not represent the most valuable habitat being used by the nesting goshawks.
Recommendation for Additional Actions – Update the procedure for delineating buffers around nest sites to incorporate the most suitable habitat and reflect best available scientific information related to the protection of the species. Review and revise Threshold Standard to clarify target and reflect best available science.

Special Interest Species: **Osprey**

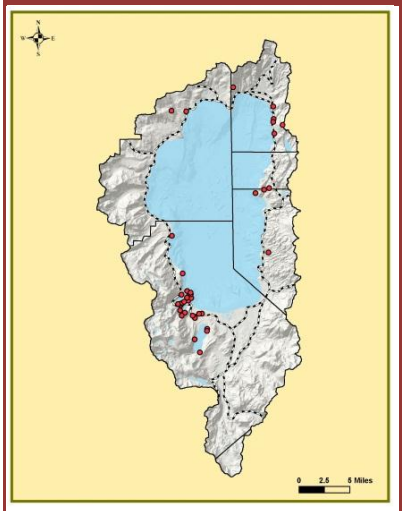
Reporting Icon	Trend

OSPREY
Status: **Considerably Better Than Target**
Trend: **Moderate Improvement**
Confidence: **High**



Total number of active Osprey nests recorded in the Tahoe Basin from 1997 through 2010 relative to the Threshold Standard of 4 population sites (red line). A significant increasing trend (dashed line) in the number of active Osprey nests was documented for the monitoring record. Source US Forest Service - LTBMU and TRPA records.

Map



Approximate locations of all recorded Osprey nests in the Tahoe Basin (1980 to 2010). Source: USFS and TRPA survey records.

Data Evaluation and Interpretation

Relevance – The Osprey (*Pandion haliaetus*) is a conspicuous large raptor that is valued for wildlife viewing. Ospreys are protected by the Migratory Bird Treaty Act, which prohibits the harming or killing of Ospreys. They are listed as a species of special concern by the California Department of Fish and Game. This provides extra protection for them when analyzing the effects of a proposed project. The number of active Osprey nests is an indicator of the viability of the Osprey population within the Tahoe Basin.
TRPA Threshold Category – Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – Provide a minimum of 4 population sites (defined as active nests) and a 0.25 mile disturbance zone around population sites.
Type of Standard – Numerical
Indicator (Unit of Measure) – The number of active Osprey nests detected each year.
Status – The Threshold Standard is in attainment. Over the past 14 years (1997-2010), the number of active Osprey nests has fluctuated between 12 and 29. The number of nests has consistently exceeded the Threshold Standard of 4 population sites, and has been 3 to 7 times the Threshold Standard. At least 29 sites are currently managed for the protection of Ospreys in the Region.
Trend – A linear regression showed a significant increasing trend in the number of active Osprey nests detected over the long term

(R^2 = 0.48, P < 0.01). The data from the 5 years since the last evaluation (2006-2010) show no major divergence from the long term trend line, indicating no recent changes in the existence or direction of the long term trend. The increasing trend is consistent with a reported global increase in the abundance of the species (NatureServe 2011).

Confidence - There is a high degree of confidence in the status because Osprey nests are easy to observe, and qualified biologists intensively monitor them following standardized boat and land-based survey protocols. There is a high degree of confidence in the existence and direction of the long-term trend because there is some variation of yearly points (counts) around the regression line with the exception of high numbers of active nests in 2003 and 2004. The overall confidence in the status and trend is high.

Interim Target – None, indicator is in compliance with adopted standard.

Target Attainment Date – None, indicator is currently in compliance with adopted standard.

Human and Environmental Drivers – Human disturbance near nesting and foraging areas can impact Osprey breeding success. Ospreys may be able to habituate to human activity depending on the timing, type, and consistency of the activity (Romsos 2000b; Ewins 1997). Osprey populations could be limited by the number of large nest trees near water and open areas, or competition with Bald Eagles or other species (Ewins 1997). However, given the limited number of Bald Eagles present during the breeding season, and the existing protections for large trees, these are not likely to be major limiting factors in Tahoe. Ospreys that breed in the Tahoe Basin likely migrate to Central or South America for the winter (Martell et al. 2001; Romsos 2000b). Ospreys breeding in Tahoe may be affected by a variety of factors in their wintering areas or along migration routes, including contamination from organochlorines (e.g. DDT), which is still used in parts of their wintering grounds (Romsos 2000b; NatureServe 2011).

Monitoring Approach – A shoreline survey is conducted by boat monthly during spring and summer months following standard protocols. Additional surveys are conducted at historic and likely nest sites at other lakes and upland areas.

Monitoring Partners – U.S. Forest Service, California Department of Parks and Recreation, and Nevada Department of Wildlife.

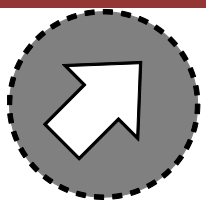
Programs and Actions Implemented to Improve Conditions – TRPA does not permit projects that would disturb nesting Ospreys or their habitat within 0.25 miles of known nests, and TRPA limits the removal of large trees that could provide nesting habitat. Additional measures that provide indirect benefits to Ospreys are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws.

Effectiveness of Programs and Actions – Existing programs have maintained appropriate nesting habitat structure and have reduced direct impacts on nesting pairs.

Recommendation for Additional Actions – Review and revise Threshold Standard to clarify target and reflect best available science.

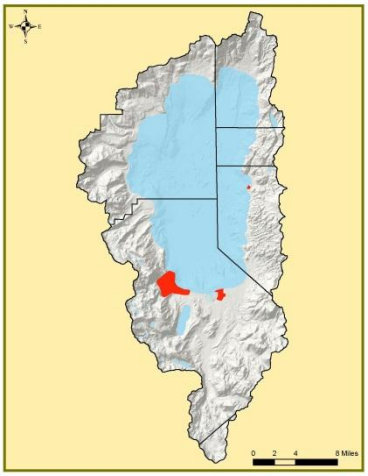
Special Interest Species: **Wintering Bald Eagle**

Reporting Icon



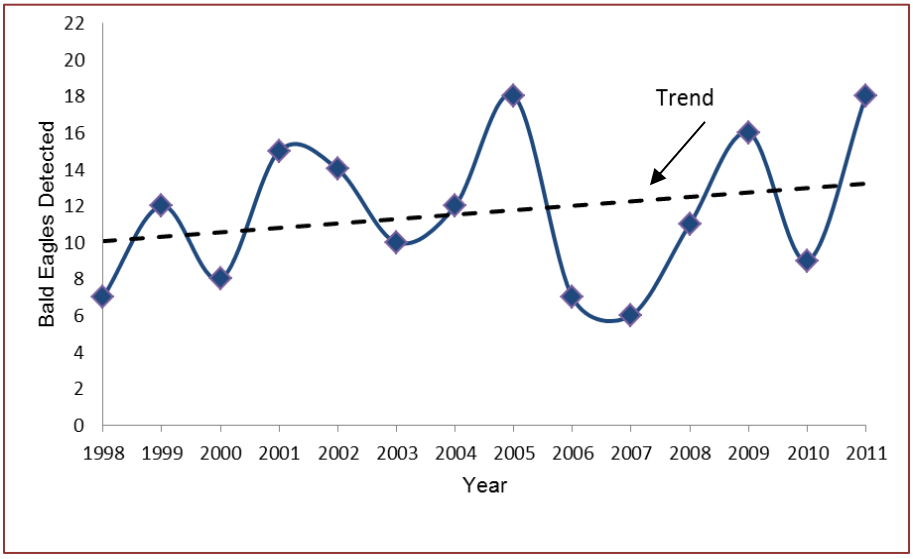
WINTERING BALD EAGLE
Status: **No Established Target**
Trend: **Moderate Improvement**
Confidence: **Low**

Map



Areas designated by TRPA for the protection of the wintering Bald Eagle population in the Lake Tahoe Basin.

Trend



Total number of Bald Eagles detected during annual winter Bald Eagle surveys throughout the Tahoe Basin from 1998 through 2011. An increasing trend was apparent In the monitoring record (1998 to 2011), but it was not statistically significant (P = 0.368).

Data Evaluation and Interpretation

Relevance – The Bald Eagle (*Haliaeetus leucocephalus*) is the national symbol and an iconic species that is exceptionally important to the public. In the lower 48 states, Bald Eagles were considered threatened under the Endangered Species Act until they were de-listed in 2007. They are still protected by the federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, which prohibit the harming, killing or possession of Bald Eagles, or their eggs or nests. The annual winter Bald Eagle survey measures the total number of Bald Eagles observed throughout the Tahoe Basin on a single day. These data are one indicator of the abundance of wintering Bald Eagles in the Tahoe Basin.
TRPA Threshold Category - Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – No Threshold Standard has been adopted for the number of individuals counted during the annual winter Bald Eagle survey, although the Threshold Standard directs the Region to maintain two "population sites".
Type of Standard – Numerical
Indicator (Unit of Measure) – The total number of individual Bald Eagles detected during annual winter surveys. This indicator provides information that is relevant to the adopted Threshold Standard of maintaining two wintering Bald Eagle population sites because it indicates whether there is evidence that Bald Eagle winter in the Region.
Status – The long-term (1998-2011), and five-year (2007-2011) average number of Bald Eagles detected are 11.6 and 12.0,

respectively. Data from 1979 -1997 exists, but this data is not comparable because it was not controlled for individuals that may have been counted more than once (TRPA 2007c). Two sites, Upper Truckee Marsh and Taylor/Tallac Marsh, extending into Emerald Bay are currently managed for the protection of the wintering Bald Eagle population (see above map).

Trend - Since 1998, the total number of Bald Eagles observed during the annual winter survey has fluctuated between 6 and 18 individuals, and may exhibit cyclical variations. A linear regression showed an increasing trend in the number of Bald Eagles detected over the long-term (R^2 = 0.68), but this trend was not statistically significant (P = 0.37). The five-year trend also showed a slightly increasing number of Bald Eagle detections (R^2 = 0.54), but this trend was also not statistically significant (P = 0.16).

Confidence - There is low confidence in the reliability of the survey data because, although it is collected following accepted protocols developed by the National Wildlife Federation, it represents only a very brief snapshot in time that may not accurately represent eagle abundance. The confidence in the trend is low for the long range and short range analysis because the regression line was not significantly different from zero and there is a fair amount of variation in the scatter of points around the regression line. There is not, however, any indication of a declining trend. Therefore, the overall confidence in the status and trend is low.

Interim Target – None, No standard or interim target has been adopted for this indicator.

Target Attainment Date – Not applicable

Human and Environmental Drivers – Many Bald Eagles wintering in the Tahoe Basin, have likely migrated from other breeding areas (Romsos 2000a; Linthicum et al. 2007). Their winter abundance in the Tahoe Basin can be influenced by a variety of factors in their breeding areas or along their dispersal routes. The availability of spawning Kokanee salmon in Tahoe's tributaries, or other food sources, may affect the abundance of wintering Bald Eagles (Laves and Romsos 2000; Reed 1979). The intensity and location of recreational activities can affect wintering Bald Eagles, although resident eagles may become habituated to regular recreational activities (Laves and Romsos 2000; Brown and Stevens 1997; Buehler et al.1991). In other areas, the structure of wintering habitat, including the size, location, and number of suitable perch trees has been shown to affect wintering Bald Eagle abundance (Stohlgren 1993).

Monitoring Approach – Professional and volunteer biologists stationed at a series of observation points surrounding Lake Tahoe record all observed eagles over the same four-hour period following protocols developed by the National Wildlife Federation.

Monitoring Partners – The US Forest Service funds the coordination of the survey and data management. Numerous agencies and volunteers provide in-kind support for the annual winter Bald Eagle survey.

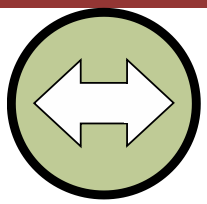
Programs and Actions Implemented to Improve Conditions - TRPA does not permit projects that would degrade habitat within known wintering areas. Additional measures that provide indirect benefits to wintering Bald Eagles are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws.

Effectiveness of Programs and Actions - Existing programs have prevented the degradation of wintering habitat structure. Recreational activities, including cross-country skiing and dog-walking, may continue to impact wintering Bald Eagles, especially migrant individuals that have not become habituated to this level of human use.

Recommendation for Additional Actions - Maintain existing protections and evaluate possible new actions to limit recreational impacts on wintering Bald Eagles. Review and revise Threshold Standard to clarify target and reflect best available science.

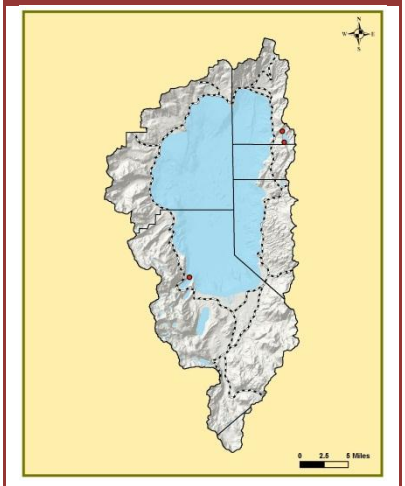
Special Interest Species: **Nesting Bald Eagle**

Reporting Icon



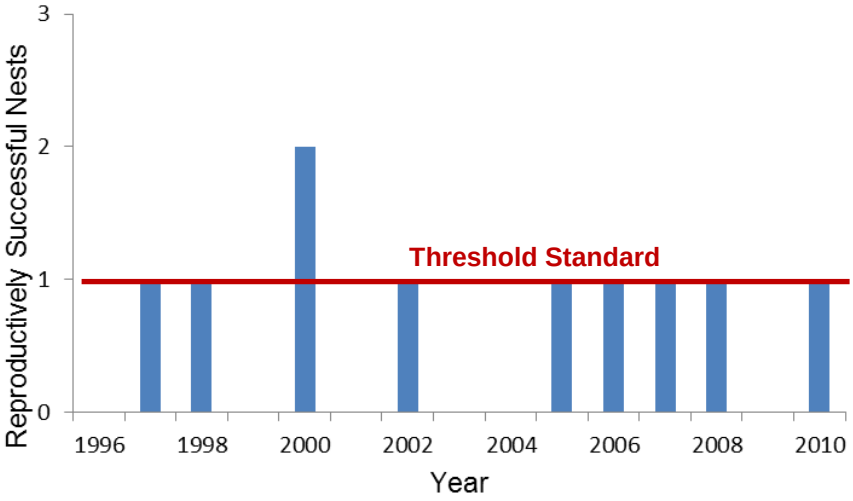
NESTING BALD EAGLE
Status: **At or Somewhat Better Than Target**
Trend: **Little or No Change**
Confidence: **High**

Map



Approximate locations of known Bald Eagle nesting areas from 1996 to 2010. Source: USFS and TRPA Survey Records

Trend



Total number of nesting Bald Eagle pairs in the Tahoe Basin that successfully fledged at least one juvenile from 1996 through 2010.

Data Evaluation and Interpretation

Relevance – The Bald Eagle (*Haliaeetus leucocephalus*) is the national symbol and an iconic species that is exceptionally important to the public. In the lower 48 states, Bald Eagles were considered threatened under the Endangered Species Act until they were de-listed in 2007. They are still protected by the federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, which prohibit the harming, killing or possession of Bald Eagles, or their eggs or nests. The number of nests that successfully produced at least one juvenile is an indicator of the Threshold Standard of one nesting population site.
TRPA Threshold Category – Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – Provide a minimum of 1 population site and a 0.5 mile disturbance zone around population sites
Type of Standard – Numeric
Indicator (Unit of Measure) – The number of nesting Bald Eagle pairs that successfully fledged at least one juvenile each year.
Status – Over the past 15 years (1996-2010), the number of reproductively successful nests, has met or exceeded the Threshold Standard of one population site 9 times, or 60% of the time. Over the past 5 years (2006-2010), the Threshold Standard has been met 4 times or 80% of the time. In general, one pair of Bald Eagles consistently nests in the Tahoe Basin, although in 2000, a second pair was present and successfully reproduced. Therefore, the indicator is "at or somewhat better than the target" or in attainment with the Threshold Standard. Three mapped areas have been identified by TRPA for the protection of the nesting Bald Eagle population

(see above map).

Trend - Since 1996, the number of reproductively successful nests has fluctuated between 0 and 2. As described above, one nesting pair has been present in most years. The lack of variation in the data, and the consistency with which one nesting pair has been observed, clearly indicate that there is no increasing or decreasing trend.

Confidence - There is a high degree of confidence in the status because all known nests are intensively monitored by qualified wildlife biologists. In addition, eagle nests are relatively easy to find, and formal boat surveys are conducted monthly during non-winter months to identify any new nests. The high confidence in the quality of the data combined with the lack of variability in that data provide a high level of confidence in the trend.

Interim Target – None, indicator is in compliance with adopted standard.

Target Attainment Date – None, indicator is currently in compliance with adopted Threshold Standard.

Human and Environmental Drivers - Bald Eagle reproductive success in the Tahoe Basin may be affected by human activity such as boat access or other recreational uses in nesting territories (Romsos 2000a), and the loss of nesting habitat including large trees in close proximity to surface water (Romsos 2000a; USFWS 1986). However, these impacts are minimized by TRPA's enforcement of disturbance buffers surrounding nest sites. The amount of fish mortality from spawning, disease, or catch and release fishing can control the amount of available carrion, which can affect nesting Bald Eagles (Jackman et al. 2007; Beauchamp et al. 1994). In other areas, weather conditions have been shown to affect reproductive success (Gende et al. 1997), although it's unknown to what degree weather affects nesting success in Tahoe.

Monitoring Approach – Known nest sites are regularly observed during the incubation and fledging periods to determine reproductive success. Monthly boat surveys are conducted during non-winter months to identify any new nest sites surrounding Lake Tahoe, and ad-hoc surveys are conducted in other areas in support of environmental assessments for proposed projects.

Monitoring Partners – California Department of Parks and Recreation, Nevada Department of Wildlife, U.S. Forest Service.

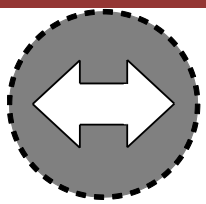
Programs and Actions Implemented to Improve Conditions – TRPA does not permit projects that would disturb nesting Bald Eagles within 0.5 miles of known nests, and TRPA limits the removal of large trees that could provide nesting habitat. Additional measures that provide indirect benefits to nesting Bald Eagles are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws.

Effectiveness of Programs and Actions – Existing programs have maintained appropriate nesting habitat structure and have reduced direct impacts on nesting pairs. Recreational activities such as boat and beach use near nests can be difficult to control, and may continue to impact nesting Bald Eagles.

Recommendation for Additional Actions – Maintain existing protections and evaluate possible new actions to reduce recreational impacts on nesting Bald Eagles. Review and revise Threshold Standard to clarify target and reflect best available science.

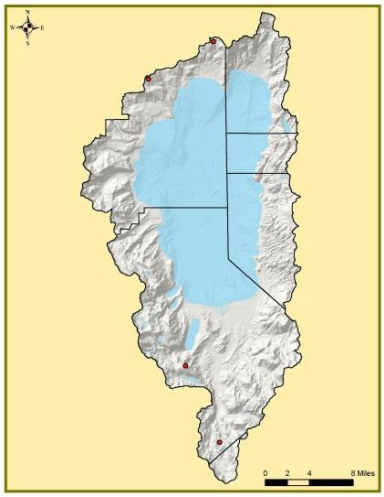
Special Interest Species: **Golden Eagle**

Reporting Icon



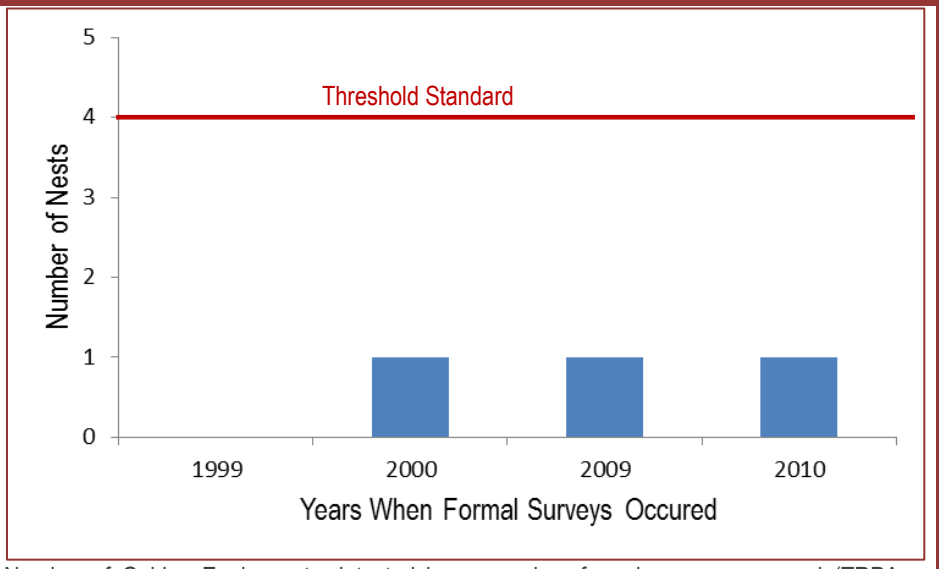
GOLDEN EAGLE
Status: **Insufficient Information**
Trend: **Little or No Change**
Confidence: **Low**

Map



Areas identified by TRPA for the protection of Golden Eagle nesting habitat in the Tahoe Basin.

Trend



Number of Golden Eagle nests detected in years when formal surveys occurred (TRPA 2001; USDA 2009e; S. Zanetti personal communication, August 15, 2011) relative to the Threshold Standard of 4 population sites.

Data Evaluation and Interpretation

Relevance - The Golden Eagle (*Aquila chrysaetos*) is a large and conspicuous raptor that is important to the public for wildlife viewing, and fills an ecological role as a primary predator of large rodents and rabbits/hares. In Tahoe, Golden Eagles are most likely year-round residents occurring in low densities (Orr and Moffitt 1971). Golden Eagle populations appear to be declining throughout the contiguous United States (Kochert and Steenhof 2002; Pagel et al. 2010). They are protected by both federal and state law, including the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, which prohibit the harming, killing or possession of Golden Eagles, or their eggs or nests.
TRPA Threshold Category – Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – Provide a minimum of 4 population sites and a 0.25 mile non-disturbance zone around population sites
Type of Standard – Numeric
Indicator (Unit of Measure) – The number of active Golden Eagle nests detected each year.
Status – Information on Golden Eagle nesting activity in the Tahoe Basin is very limited, making it speculative to determine attainment status. Formal Golden Eagle surveys were conducted in selected areas of suitable nesting habitat in four of the past 12 years. These surveys never resulted in the detection of more than one active nest. However, the most recent surveys only covered 2 to 3 areas of potential nesting habitat per year. Other potential nesting habitat exists and was not surveyed, making it impossible to know whether the Threshold Standard would have been met if more comprehensive surveys were conducted. Four mapped areas

have been identified by TRPA for the protection of the Golden Eagle population (see above map).

Trend – There is no indication of an increasing or decreasing trend in the number of active Golden Eagle nests in the Tahoe Basin. When formal surveys have been conducted over the last 12 years, the results have been fairly consistent from year to year. Recent survey results appear to be consistent with historic accounts from the early parts of the 1900s (Orr and Moffitt 1971), indicating that no major long-term change has occurred. Golden Eagles are very conspicuous and easy to identify, and no major changes in the number of incidental sightings have occurred. Recent Golden Eagle trends throughout California and Nevada are poorly understood. Throughout North America, a synthesis of available trend data showed an overall decreasing trend in Golden Eagle abundance in the contiguous United States (Kochert and Steenhof 2002; Pagel et al. 2010).

Confidence – There is low confidence in our ability to determine status and trend, because formal surveys for nesting Golden Eagles have only been conducted in 4 of the last 12 years, and these surveys did not include all potential nesting habitat in the Tahoe Basin. In addition, Golden Eagle populations have shown cyclical fluctuations in response to prey populations (Kochert and Steenhof 2002; Steenhof et al. 1997), which could confuse the evaluation of trends based on a limited number of years.

Interim Target – Conduct formal nest surveys each year for the next five-year evaluation period. Identify at least 2 active nests by the next five-year evaluation.

Target Attainment Date – There is insufficient information available to project a date for attainment of the Threshold Standard.

Human and Environmental Drivers – The Tahoe Basin experiences a significant amount of recreational use, which can result in nest abandonment or stress that reduces an eagle's chances of survival (Pagel et al. 2010; Boeker and Ray 1971). Golden Eagle prey species' populations can experience significant annual variability, which can affect Golden Eagle reproductive productivity (Kochert and Steenhof 2002; Steenhof et al.1997). Weather conditions, such as severe winters or unusually hot spring days can also reduce the reproductive success of Golden Eagles (Steenhof et al.1997).

Monitoring Approach – Biologists observe historic or potential nest sites for a minimum of 4 hours per month, April – August following standard U.S. Forest Service protocol. Incidental sightings are used the help focus surveys on likely nest locations.

Monitoring Partners – U.S. Forest Service.

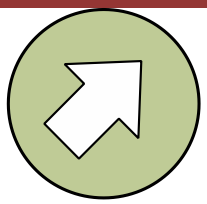
Programs and Actions Implemented to Improve Conditions – TRPA does not permit projects that would disturb nesting Golden Eagles or their habitat within 0.25 miles of known nests. Additional measures that provide indirect benefits to Golden Eagles are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws.

Effectiveness of Programs and Actions – There is insufficient information to empirically evaluate the effectiveness of programs and actions intended to protect Golden Eagles, although the use of buffers to protect sensitive species is well supported in the scientific literature.

Recommendation for Additional Actions – Continue and expand regular nest monitoring to evaluate the status of nesting Golden Eagles. Evaluate the suitability and distribution of potential nesting habitat to determine if the available habitat could support the Threshold Standard of four active nests. Review and revise Threshold Standard to clarify target and reflect best available science.

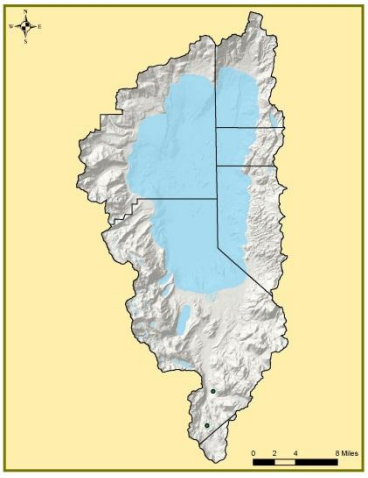
Special Interest Species: **Peregrine Falcon**

Reporting Icon



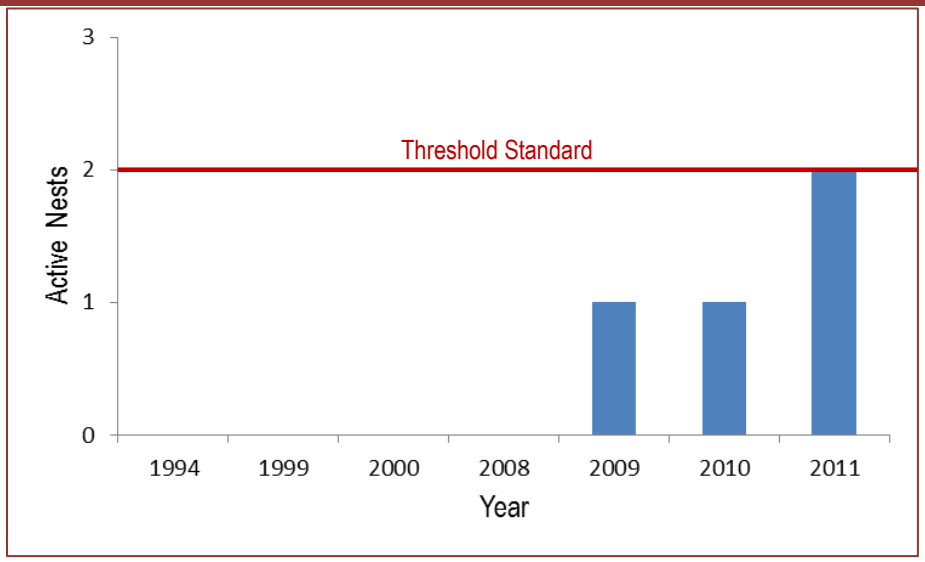
PEREGRINE FALCON
Status: **At or Somewhat Better Than Target**
Trend: **Moderate Improvement**
Confidence: **Moderate**

Map



Areas identified by TRPA for the protection of Peregrine Falcon nesting habitat in the Tahoe Basin.

Trend



Total number of active Peregrine Falcon nests recorded in the Tahoe Basin during years when formal surveys were conducted (USDA 2011d; TRPA 2001) relative to the Threshold Standard of 2 population sites.

Data Evaluation and Interpretation

Relevance – Peregrine Falcon (*Falco peregrinus anatum*) populations declined precipitously across the country in the mid-1900s (USFWS 2003). They were recorded in the Tahoe Basin in the early 1900s (Orr and Moffitt 1971), but were not observed naturally occurring in Tahoe between 1960 and 2007 (Romsos et al. 2000; S. Zanetti personal communication, August 15, 2011; DFG 2007). In the mid-1980s, several juveniles were re-introduced, but left the Tahoe Basin the same year (USDA 2009e). The species was considered endangered under the federal Endangered Species Act until they were removed from endangered status in 1999 due to an overall increase in the population. They were, however, considered endangered by the State of California until 2009. Their recovery is a result of banning DDT and similar chemical contaminants, and active re-introductions (USFWS 2003). They are still protected by the Migratory Bird Treaty Act, which prevents harming Peregrine Falcons or their nests.
TRPA Threshold Category – Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – Provide a minimum of 2 population sites (defined as active nests) and a 0.25 mile non-disturbance zone around population sites
Type of Standard – Numeric
Indicator (Unit of Measure) – The number of active Peregrine Falcon nests detected each year.
Status – Previous habitat evaluations concluded that the Tahoe Basin contains less than ideal nesting habitat (Boyce and White 1980), and prior reintroduction efforts were not successful (USDA 2009e). As a result, Peregrine Falcons were not expected to nest in Tahoe and nest surveys were only conducted sporadically. In 2007, several biologists reported seeing Peregrine Falcons in Tahoe,

and the U.S. Forest Service began conducting annual nest surveys in 2008. In 2011, two active nests were confirmed and indications of one additional nest was observed, but not confirmed. The Threshold Standard of two population sites is in attainment. Two mapped areas have been identified by TRPA for the protection of Peregrine Falcon population (see above map).

Trend – There is an apparent increasing trend in the number of active nests, based on available data from the seven formal surveys that have been conducted over the past 18 years. The trend is consistent with an increase in Peregrine Falcon abundance nationally (USFWS 2003) and across California (Linthicum 2006).

Confidence - There is a high degree of confidence in the presence of all confirmed active nests because they are positively identified by qualified biologists. However, confidence is low in the trend due to the limited survey effort prior to 2008. The overall confidence in the status and trend is medium.

Interim Target – None, indicator is in compliance with adopted Threshold Standard.

Target Attainment Date – None, indicator is currently in compliance with adopted Threshold Standard.

Human and Environmental Drivers – In some areas Peregrine Falcons have shown reduced reproductive success when nesting cliffs are used by rock climbers (Mearns and Newton 1988; Cade et al.1996). In Tahoe, some of the cliffs containing nests are used by rock climbers (USDA 2009e), which could affect nesting success. An evaluation of potential Peregrine Falcon habitat in Tahoe concluded that potential nesting habitat exists, but it is of marginal quality, which may limit the total number of active nests the region can support (Boyce and White 1980). Some Peregrine Falcons nesting in Tahoe may migrate to Central or South America for the winter, where they could be affected by contamination from organochlorine pesticides (e.g. DDT) (USFWS 2003).

Monitoring Approach – Biologists observe historic or potential nest sites for a minimum of 4 hours per month, April–August following standard U.S. Forest Service protocol. Incidental sightings are used the help focus surveys on likely nest locations.

Monitoring Partners – U.S. Forest Service.

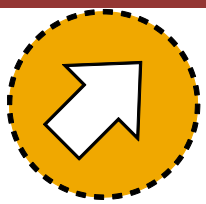
Programs and Actions Implemented to Improve Conditions – TRPA does not permit projects that would disturb nesting Peregrine Falcon or their habitat within 0.25 miles of known nests. The U.S. Forest Service has initiated a public outreach effort in collaboration with local rock climbers to limit the use of rock climbing routes near active nests. Additional measures that provide indirect benefits to Peregrine Falcon are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws.

Effectiveness of Programs and Actions – It is too early to evaluate the effectiveness of specific programs to protect Peregrine Falcon because they were only recently implemented after the detection of nests in the Tahoe Basin. The number of Peregrine Falcon nests has increased and recently attained the Threshold Standard, indicating that recent management activities have not resulted in major impediments to the species.

Recommendation for Additional Actions – Continue regular nest monitoring, and monitor rock climbing use near active nests to evaluate the success of protective actions. Review and revise Threshold Standard to clarify target and reflect best available science.

Special Interest Species: **Waterfowl**

Reporting Icon



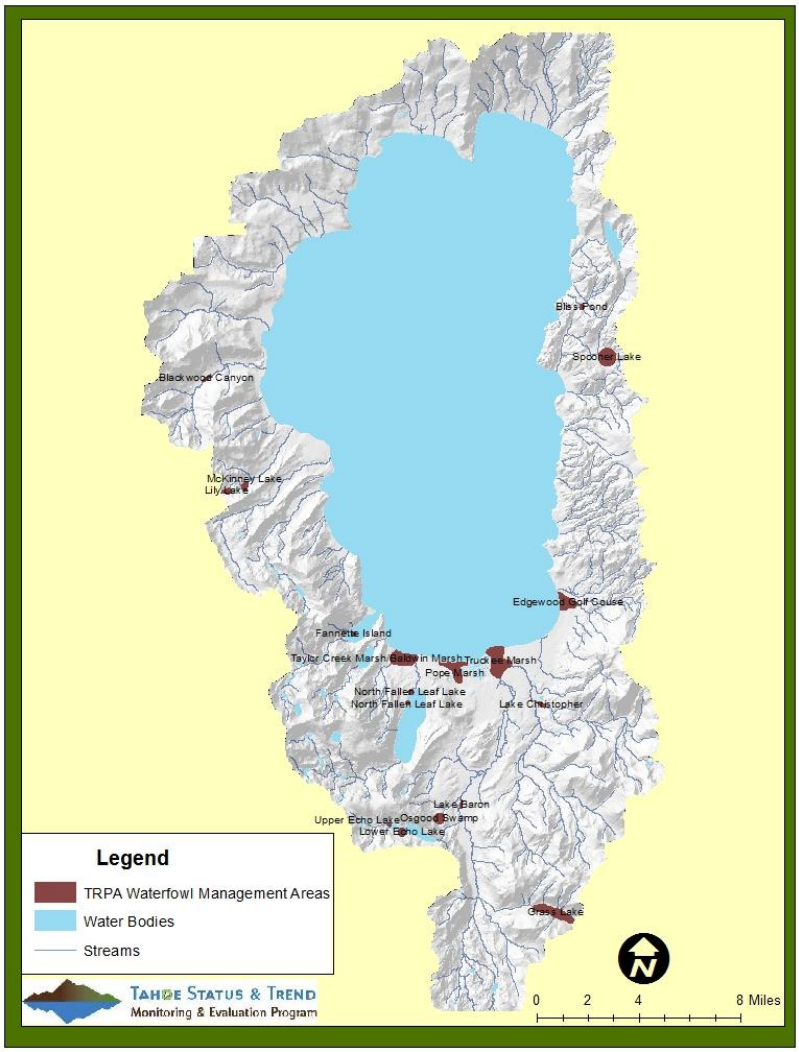
WATERFOWL
Status: **Somewhat Worse Than Target**
Trend: **Moderate Improvement**
Confidence: **Low**

Status

Site Name	*Score*
Grass Lake	1
Lily Lake	1
McKinney Lake	1
Osgood Swamp	1
Lake Christopher	2
Lower Echo Lake	2
Pope Marsh	2
Spooner Lake	2
Truckee Marsh	2
Upper Echo Lake	2
Baldwin Marsh	2
Blackwood Canyon	2
Bliss Pond	2
North Fallen Leaf Lake	3
Taylor Creek Marsh	3
Edgewood Golf Course	4
Fannette Island	4
Lake Baron	4

Recreational impact and habitat intactness score for the 18 waterfowl threshold sites. Sites are ranked 1 to 4 with 1 being the most intact and 4 being the most disturbed.

Map



Map of the Tahoe Basin showing the location and name of the 18 waterfowl designated by TRPA as population sites.

Data Evaluation and Interpretation

Relevance –Waterfowl consist of numerous species in the family *Anatidae* (i.e., ducks and geese). Protecting habitat for waterfowl also protects habitat for other water birds such as the American Bittern, Eared Grebe, Marsh Wren, and Virginia Rail (TRPA 2007c). The Tahoe Basin supports breeding waterfowl and serves as a stopover for waterfowl migrating along the Pacific Flyway. Many waterfowl species are valued for wildlife viewing and hunting, and collectively they are an important component of functioning wetland ecosystems. Waterfowl are dependent on various aspects of wetlands for their survival, so they serve as one indicator of the biological integrity of wetland ecosystems.
TRPA Threshold Category – Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – Protect a minimum of 18 waterfowl population sites.
Type of Standard – Numeric and Management
Indicator (Unit of Measure) – The status and trend determination is based on a qualitative assessment of habitat condition and

recreation impacts, and a review of management actions that could affect waterfowl at the 18 mapped waterfowl sites. Some previous evaluations have also used a comparison of the species richness of waterfowl, water bird, and detrimental or non-native species (e.g. Brown-headed Cowbird, European Starling) (TRPA 2001; TRPA 2007c).

Status – A qualitative habitat assessment was conducted in 2011 that used the same criteria as the 2001 Threshold Evaluation. This assessment resulted in an improved score for only one of the waterfowl sites since 2001, when they were determined to be in non-attainment. Five of the 18 waterfowl sites continue to be impacted by heavy or extensive human disturbance. Since there has been only a minimal improvement in the habitat scores, the Waterfowl Threshold Standard continues to be in non-attainment. The Region supports greater than 300 small lakes and water bodies other than those mapped by TRPA, all of which provide suitable habitat for various waterfowl species. These other lakes and ponds are currently protected from adverse impacts according to TRPA rules related to Stream Environment Zones.

Trend – The habitat assessment showed an improved score for the Blackwood Canyon site when compared to the previous assessment that was conducted in 2001. This improvement is the result of the U.S. Forest Service completing a large-scale restoration project, and blocking motorized access into the meadow. No other scores changed since the 2001 habitat assessment, but several management actions have occurred that should lead to improved habitat conditions. At the Truckee Marsh site, the CTC recently instituted a seasonal dog closure during the peak breeding season, which is expected to improve habitat use and reproductive success by waterfowl. At the Osgood Swamp site, the U.S. Forest Service decommissioned a trail accessing the wetland, reducing human incursions into the site. During the habitat assessment, no indications of substantial increased levels of disturbance were noted at any of the waterfowl sites. Therefore, there is an improving trend in the habitat condition of waterfowl sites.

Confidence – The confidence in the status and trend is low. No comprehensive waterfowl surveys have been conducted since the last Threshold Evaluation in 2006, so status and trend determinations are based solely on habitat evaluations and recent management actions. The habitat evaluations and review of management actions provide information on the physical condition of waterfowl habitat and the level of human disturbance, but they provide less information than direct measures of waterfowl use at the sites. Other factors that are not measured by the habitat evaluations could be affecting waterfowl populations.

Interim Target – Reassess waterfowl sites by measuring and comparing the species richness (total number of species) of waterfowl, water birds, songbirds, and detrimental species, following the methods used in 2006 Threshold Evaluation (TRPA 2007c). Achieve an average increase in the percentage of waterfowl relative to detrimental species, when compared to the previous surveys reported in the 2006 Threshold Evaluation.

Target Attainment Date – There is insufficient information available to project a date for attainment of the Threshold Standard.

Human and Environmental Drivers – Many areas of waterfowl habitat in Tahoe experience significant recreational use. This use can reduce reproductive success by leading to nest abandonment, decreased hatching success, and reduced survivorship of hatchlings; and can cause mortality in non-breeding waterfowl by increasing energy expenditures and reducing foraging success (Korschgen and 1992; Knight and Gutzwiller 1995). Physical habitat conditions, such as the type and configuration of vegetation communities and area of open water are good predictors of waterfowl species richness in Tahoe (Schlesinger and Romsos 2000), so alterations to these physical characteristics would likely affect waterfowl. Specific habitat requirements vary for different waterfowl species, but the amount, diversity, and level of alterations to wetlands may be a driver of waterfowl populations (Batt et al.1992). Waterfowl populations in Tahoe may also be affected by annual and seasonal changes in the availability of food, which can be influenced by weather. This temporary food scarcity can reduce reproductive success or cause waterfowl to relocate to areas with more available food sources (Batt et al.1992).

Monitoring Approach – For the qualitative habitat assessment, biologists rank each waterfowl site on a scale of 1 to 4 based on observations of recreational impacts and intactness of habitat. For the waterfowl surveys, which were not completed during this evaluation period, biologists conduct breeding bird observations for three to four one-hour periods at each mapped waterfowl habitat site. All breeding bird species are recorded and the species richness of waterfowl, water birds, songbirds, and species that are indicative of disturbance or detrimental to waterfowl are compared.

Monitoring Partners – US Forest Service, TRPA

Programs and Actions Implemented to Improve Conditions – TRPA does not permit projects that would impact breeding or migrating waterfowl within mapped areas of waterfowl habitat. Additional measures that provide indirect benefits to waterfowl are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws. A habitat restoration project has been completed at Blackwood Canyon, and restoration projects are being developed at Truckee Marsh and Edgewood Golf Course, which will enhance habitat conditions at these waterfowl sites. The California Tahoe Conservancy recently closed the Truckee Marsh to dogs during the breeding season.

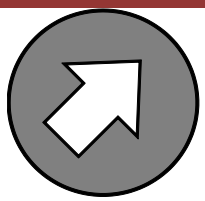
Effectiveness of Programs and Actions – No formal waterfowl surveys have been completed recently to evaluate the effects of programs and actions intended to improve conditions. Existing protections have prevented any projects from directly degrading mapped areas of waterfowl habitat. However, several waterfowl sites including Fannette Island, Lake Baron, and Edgewood Golf Course are used extensively for recreational activities, which could reduce their value to waterfowl.

Recommendation for Additional Actions – Resume waterfowl surveys for several years prior to the next Threshold Evaluation to assess waterfowl status and trends based on direct measures of species richness. Evaluate options for reducing recreation impacts.

Review and revise Threshold Standard to clarify target and reflect best available science.

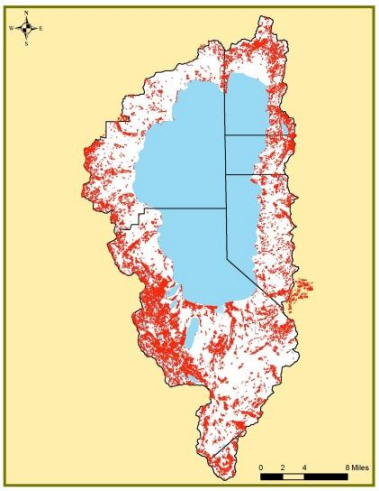
Special Interest Species: **Deer**

Reporting Icon



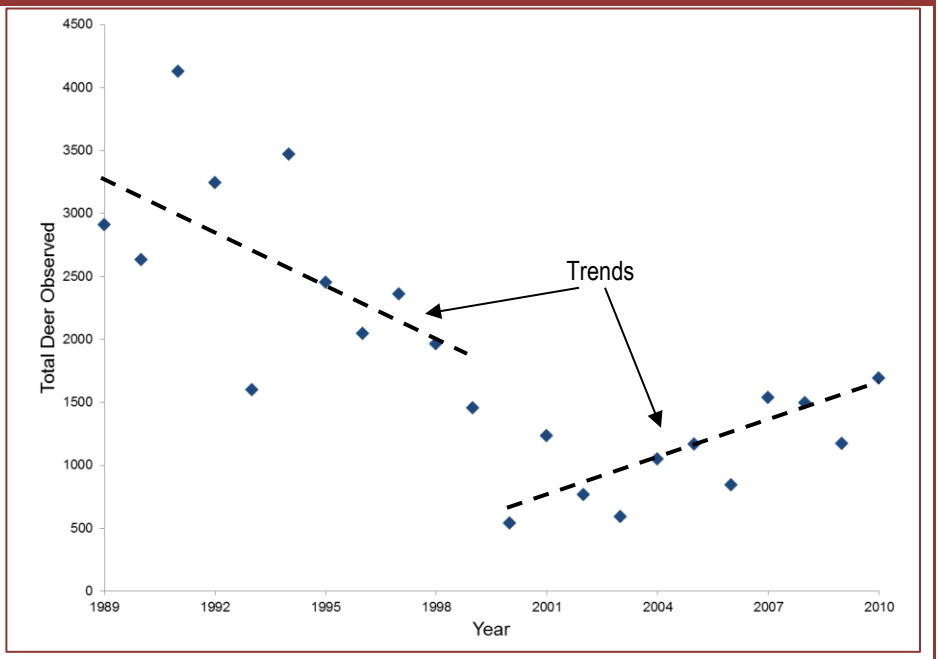
DEER
Status: **No Established Target**
Trend: **Moderate Improvement**
Confidence: **Moderate**

Map



Suitable mule deer fawning and forage habitat (summer) in the Lake Tahoe Region.

Trend



Total combined number of deer observed during spring and post-hunt surveys in the vicinity of the Tahoe Basin from 1989 through 2010. Two distinct trends are evident, with an apparent change in the direction of the trend around the year 2000. A significant decreasing trend existed from 1989 to 1999, followed by a significant increasing trend from 2000 to 2010.

Data Evaluation and Interpretation

Relevance – Mule Deer (*Odocoileus hemionus)* are of exceptional value to the public for wildlife viewing and hunting. Deer can be found in the Tahoe Basin during the summer and typically migrate to lower elevation areas with less snow for the winter (DFG 2006). The spring and fall counts indicator measures the total number of deer counted during post-hunt (fall) and spring aerial surveys in the vicinity of the Tahoe Basin (Nevada hunting units 192, 194, and 196). The counts are an indicator of deer abundance in the Tahoe Basin. This indicator provides information on trends in deer populations, but does not provide information on the total number of deer in the Tahoe Basin, which may be higher or lower than the numbers presented here.
TRPA Threshold Category - Wildlife
TRPA Indicator Category – Special Interest Species
Adopted Standards – No Threshold Standard has been adopted for the spring and fall deer counts indicator. This indicator provides information relevant to the adopted Management Standard requiring maintenance of all fawning habitat in the Tahoe Basin.
Type of Standard - Not applicable
Indicator (Unit of Measure) – Total number of deer observed during spring and post-hunt aerial surveys in Nevada hunting units 192, 194, and 196.
Attainment Status - No target has been established for the fall and spring deer counts. Since 1989 the total number of Deer observed during the combined spring and post-hunt counts has fluctuated between 540 and 4128 individuals. The long-term (1989-2010), and five year (2006-2010) average number of deer observed are 1835 and 1349, respectively.

Trend - Two distinct trends are evident. From 1989 – 1999, a linear regression showed a statistically significant ($P = 0.04$, $R^2 = 0.38$) decreasing trend in the number of deer detected. The trend appears to have reversed direction, and from 2000 to 2010, a linear regression showed a statistically significant ($P = 0.01$, $R^2 = 0.54$) increasing trend.

Confidence – There is a low level of confidence in the reliability of the survey data. Data are collected by qualified wildlife biologists following standard protocols. However, since 2006 the post-hunt surveys have been conducted slightly later, which may allow a greater portion of the herd to migrate into the study area and increase the number of observations (NDOW 2007). This change in survey timing reduces the confidence in making long term comparisons of the data. There is, however, a high level of confidence in the existence and direction of the trends because there is little scatter of yearly points (counts) around the regression line after 1995. The overall confidence in the status and trend is medium.

Interim Target - None, No standard or interim target has been adopted for this indicator.

Target Attainment Date – Not applicable, meadow habitats are currently protected from urban development through Regional Plan ordinances.

Human and Environmental Drivers - The previous declining trend in the deer population was likely due to wintering habitat loss and fragmentation in areas outside the Tahoe Basin (NDOW 2010; Wildlife Action Plan Team 2006). This decline coincided with population declines throughout Nevada (Wasley 2004). The more recent increasing trend in the deer population could be the result of targeted habitat improvements implemented by public agencies (Wildlife Action Plan 2006; NDOW 2006), and/or a general decrease in the rate of development in recent years. TRPA has not permitted projects that would reduce the availability of fawning habitat, or reduce the connectivity of known migration corridors within the Tahoe Basin, so changes in habitat conditions in the Basin were not a likely driver of either trend.

Monitoring Approach – Biologists from the Nevada Department of Wildlife and the California Department of Fish and Game perform a combination of line transect and directed search aerial surveys to record the total number of deer observed and categorize them by age and sex. The surveys include a post hunting season (fall) survey in December or January, and spring survey in March. Only a small portion of these surveys occur within the eastern portion of Tahoe Basin, but these surveys document migratory herds, some of which enter the Basin for portions of the year.

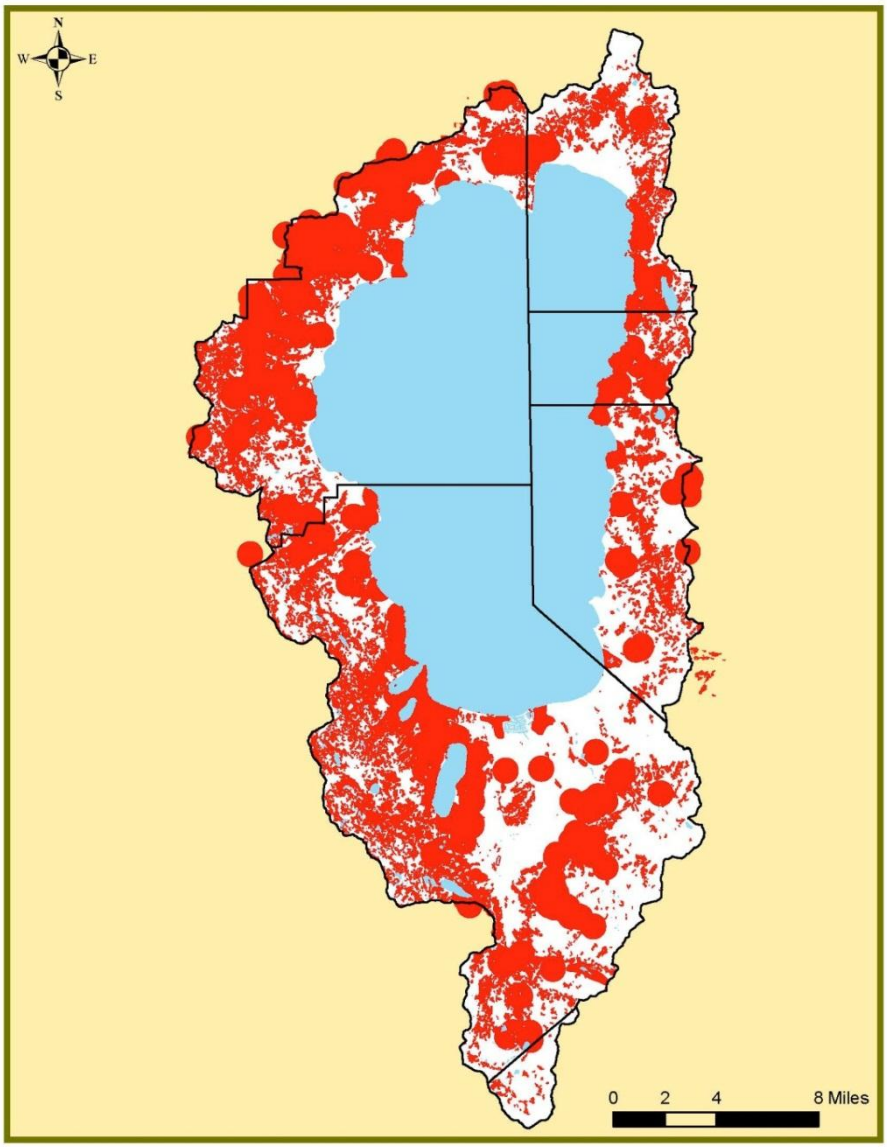
Monitoring Partners - Nevada Department of Wildlife and the California Department of Fish and Game.

Programs and Actions Implemented to Improve Conditions – TRPA does not permit projects that would degrade fawning habitat or fragment known migration corridors. Additional measures that provide indirect benefits to Mule Deer are found in the TRPA Goals, Polices, and Code of Ordinances, as well as other state and federal laws.

Effectiveness of Programs or Actions – Existing programs have maintained the condition of fawning habitat and migration routes within the Tahoe Basin. Development, fragmentation, and other habitat modifications outside the Tahoe Basin continue to have significant influence over deer populations in the Basin.

Recommendation for Additional Actions – Maintain existing protections and increase coordination with land management agencies outside the Basin to improve conservation of habitat and migration routes. Review and revise Threshold Standard to clarify target and reflect best available science.

Special Interest Species: **Disturbance (Free) Zones**

Reporting Icon	Map
 Status: **Implemented**	 Map showing the aerial extent of disturbance (free) zones for all TRPA listed special status species in the Lake Tahoe Basin. The habitat quality in undeveloped open spaces within disturbance (free) zones according to TRPA (1986) is to be conserved for Special Interest Species. About 50% of the Region's landscape is managed for the protection of Special Interest Species.

TRPA Listed Species and Species Groups

- Bald Eagle (nesting)
- Bald Eagle (wintering)
- Osprey
- Peregrine Falcon
- Golden Eagle
- Waterfowl
- Deer
- Northern Goshawk

Data Evaluation and Interpretation

Threshold Category – Wildlife
Indicator Category – Special Interest Species
Adopted Standards – Maintain a nondegradation standard for Special Interest Species habitat in mapped locations.
Type of Standard - Management
Relevance – Disturbance-free zones protect important sites that are used by Special Interest Species. By restricting habitat manipulations or other activities that would degrade the condition of habitat within the site. The disturbance-free zones include 0.5 mile radius buffer around goshawk and Bald Eagle nests, a 0.25 mile radius buffer around Osprey, Golden Eagle, and Peregrine

Falcon nests, and mapped areas of Bald Eagle wintering habitat and mule deer fawning habitat. A disturbance-free zone also applies to mapped areas of waterfowl habitat, but this Management Standard is evaluated separately in combination with the Numerical Standard for waterfowl. These Special Interest Species receive protection because they are locally important due to their rarity and/or exceptional public interest for wildlife viewing or hunting.

Status – The Management Standard has been implemented by TRPA and other partner agencies in the Tahoe region. As described below, significant regulations are in place to protect disturbance-free zones from formal uses that would degrade their condition. The TRPA Code of Ordinances describes disturbance-free zones for Northern Goshawk, Bald Eagle, Osprey, Peregrine Falcon, and Golden Eagles; prohibits actions that would significantly impact their habitat or lead to the local extirpation or displacement of a population; and authorizes TRPA to require special conditions to mitigate or avoid impacts to Special Interest Species (TRPA 1987a). A land capability system is implemented through the code of ordinances, which significantly limits development or other disturbance in low capability lands (TRPA 1987a). These low capability lands coincide with mapped areas of mule deer fawning habitat (i.e., meadows), providing protection for fawning habitat. The Code of Ordinances also requires a formal environmental review including consideration of alternatives and mitigation measures when a project may have a significant impact on Special Interest Species or other thresholds (TRPA 1987a). Prior to approving any project, TRPA must make specific findings demonstrating that the project is consistent with the Code of Ordinances and will not exceed any Threshold Standards, including requirements for the protection of disturbance-free zones for Special Interest Species (TRPA 1987a).

Human and Environmental Drivers – The suitability of habitat within disturbance-free zones can be affected by recreational use such as dog walking, biking, off road vehicle use, or boating. The impacts of these activities vary with their timing, duration, intensity, frequency, and location (Liddle 1997; Knight and Gutzwiller 1995). Some Special Interest Species are more sensitive to recreational use than others, but in general, this type of disturbance can cause animals to vacate an area, be unsuccessful at breeding, or otherwise reduce their chances of survival by increasing energy expenditures associated with avoiding the disturbance and reducing foraging time (Liddle 1997; Knight and Gutzwiller 1995). Natural processes including wildfire, decay, or wind can also reduce the suitability of habitat within disturbance-free zones by eliminating important habitat features such as nest trees.

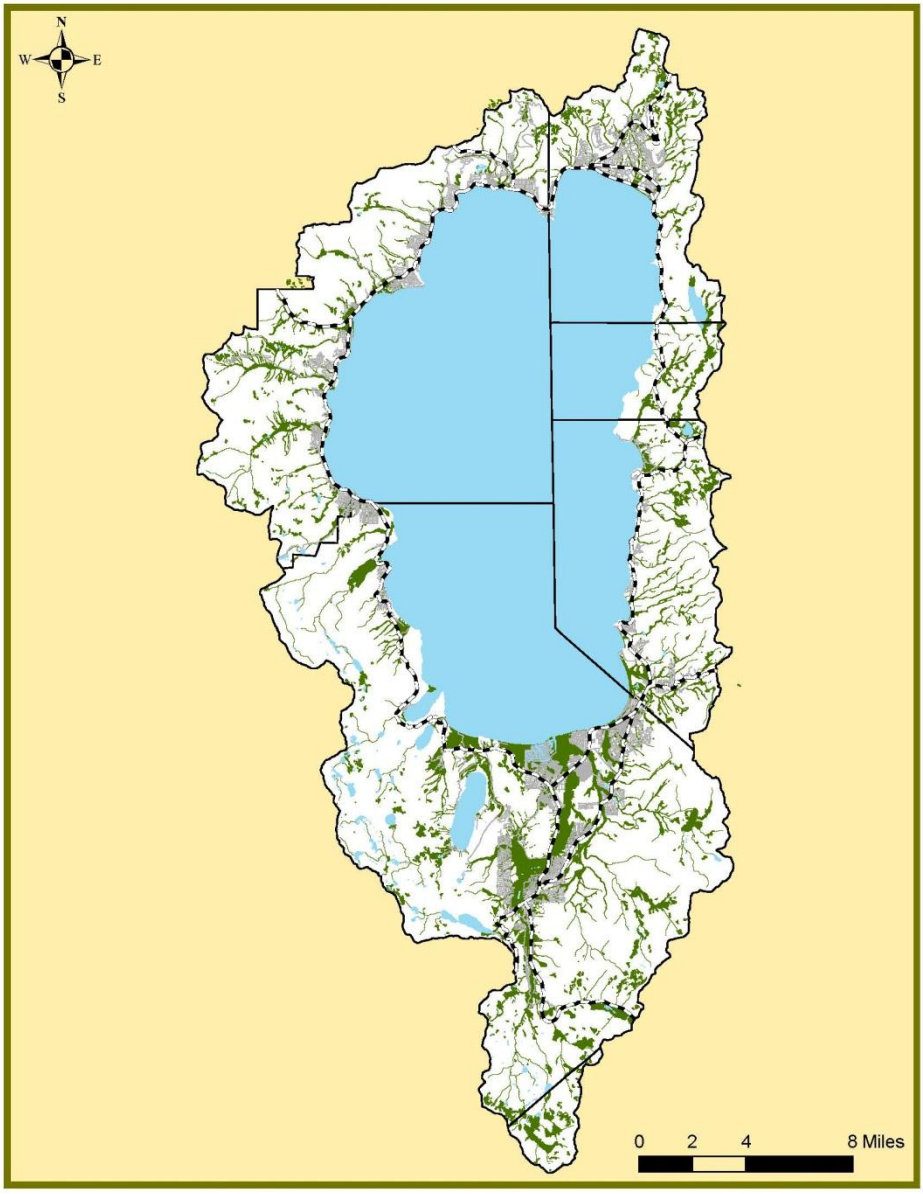
Management Partners – The U.S. Forest Service, Nevada Department of Wildlife, California Tahoe Conservancy, and California Department of Parks and Recreation all contribute to the management and monitoring of disturbance-free zones for Special Interest Species.

Programs and Actions Implemented to Improve Conditions – As described above, significant regulatory protections exist in the TRPA Code of Ordinances that prohibits human-caused habitat degradation within disturbance-free zones. Since the creation of the Environmental Improvement Program in 1997, approximately 14,000 acres of wildlife habitat have been enhanced, over 3000 acres of sensitive lands have been protected through public acquisition, over 750 acres of wetlands have been restored, and over 45,000 acres of forested lands have been treated (TIMMS 2011b; TRPA 2011b; TRPA 2009). These projects have been designed to benefit a number of natural resources including improving habitat conditions for Special Interest Species. Northern Goshawks and Bald Eagles are also considered Sensitive Species by the U.S. Forest Service, and as such they receive additional consideration in all management decisions affecting Forest Service lands.

Effectiveness of Programs and Actions – Existing regulations have protected the habitat structure within disturbance-free zones, and have protected species within these zones from direct impacts associated with construction projects or resource management actions. Environmental improvement projects have expanded key habitat types, such as wet meadows, and have treated forested areas to promote late seral stands, which can be beneficial to several Special Interest Species. However, recent research has indicated that recreational use is impacting the suitability of habitat for at least one Special Interest Species (Morrison et al. 2011), and other species groups (such as waterfowl) may also be affected by dispersed recreational uses (Liddle 1997; Knight and Gutzwiller 1995).

Recommendation for Additional Actions – Evaluate opportunities to reduce recreational impacts on disturbance-free zones through a reduction in road and trail densities with disturbance zones, education programs, or redirection of recreational uses.

Management Standard: **Habitats of Special Significance (Riparian Habitats)**

Reporting Icon	Map
Status: **Implemented**	

Map showing the spatial extent and distribution of riparian areas (green) protected by the Habitats of Special Significance Management Standard and other policies.

Photos

Images of representative riparian areas protected by TRPA's Habitats of Special Significance Management Standard.

Data Evaluation and Interpretation

Relevance – Riparian and wetland areas contain a mosaic of vegetation communities, moisture gradients, and microclimates that make them some of the most diverse and productive terrestrial areas (i.e., provide habitats for many species) (Kondolf et al.1996). Riparian and wetland areas occupy a small percentage of the Basin, but they support more wildlife species than any other vegetation types (Kattelmann and Embury 1996). For example, in an area with similar environmental conditions in the nearby Inyo National Forest, riparian and wetland areas occupied less than 1% of the land area but were important to 75% of the local wildlife species (Kondolf et al. 1987). The same areas are desirable for human-related uses, which have resulted in the degradation of 75% of all marshes and 50% of all meadows in the Basin (Manley et al. 2000). Since riparian and wetland areas are relatively rare and

important compared to other vegetation types, even small modifications to these areas can have a greater impact on wildlife species than modifications in other areas (Kattelmann and Embury 1996; Graber 1996).

Threshold Category – Wildlife

Indicator Category – Habitats of Special Significance

Adopted Standards – TRPA: "*A nondegradation standard shall apply to significant wildlife habitat consisting of deciduous trees, wetlands, and meadows while providing for opportunities to increase the acreage of such riparian associations*." The US Forest Service and State agencies also implement applicable management standards that protect riparian areas.

Type of Standard - Management

Status – The Region is in attainment with this Management Standard. As described below, regulations are in place to protect riparian and wetland areas from permanent disturbance such as residential and commercial development, and a restoration program has been underway to actively expand and restore riparian areas. The TRPA Code of Ordinances implements a land capability system that significantly limits development in riparian or wetland areas and provides incentives to relocate existing development from these areas to upland areas (TRPA 1987a). With few exceptions, the TRPA Code of Ordinances prohibits the manipulation of vegetation that would permanently impact riparian or wetland integrity (TRPA 1987a). TRPA is required to conduct a formal environmental review, including consideration of alternatives and mitigation measures, when a project may have a significant impact on Habitats of Special Significance or other Threshold Standards (TRPA 1987a). Prior to approving any project, TRPA must make specific findings demonstrating that the project is consistent with the Code of Ordinances and will not exceed any Threshold Standards, including requirements for protecting the integrity of riparian and wetland areas (TRPA 1987a). TRPA administers the interagency Environmental Improvement Program which facilitates the implementation of projects to restore, protect, enhance and expand riparian and wetland areas.

Human and Environmental Drivers – The condition of riparian and wetland areas in the Tahoe Basin is in large part a result of past land uses. The functions of wetlands, streams and surrounding riparian areas have been degraded through historic logging, grazing, and direct manipulation of channels. Reduced function resulted in decreased extent and vigour of riparian and wetland vegetation, and a reduction in the suitability of riparian and wetland areas for many wildlife species (Lindstrom et al. 2000; Elliott-Fisk et al.1996). On-going restoration programs are a primary factor affecting the condition of riparian and wetland areas (Elliott-Fisk et al.1996). These restoration projects may temporarily degrade habitat quality during and immediately following construction, but they result in a long-term increase in the extent and vigour of riparian and wetland vegetation, and improved habitat conditions for multiple species. Other factors affecting the suitability of riparian and wetland areas include weather fluctuations and climate change, influences of non-native species (e.g. brown-headed cowbird or noxious weeds), and disturbance from recreational uses (Kondolf et al. 1996; Kattelmann and Embury 1996; Manley et al. 2000).

Management Partners – The U.S. Forest Service, Nevada Division of State Lands, California Tahoe Conservancy, Nevada Division of State Parks, and California Department of Parks and Recreation.

Programs and Actions Implemented to Improve Conditions – As described above, significant regulatory protections exist in the TRPA Code of Ordinances, which prohibit habitat degradation within riparian and wetland areas. Since the creation of the Environmental Improvement Program in 1997, over 750 acres of wetlands have been restored, and over 3000 acres of sensitive lands have been protected through public acquisition (TRPA 2009). Land management agencies have redirected potentially detrimental recreational uses away from riparian areas through projects such as the High Meadows Restoration or the Eagle Rock Trail Re-alignment. In addition, the U.S. Forest Service and other agencies have actively removed conifers that have encroached into aspen stands and meadows in order to maintain and re-establish riparian areas.

Effectiveness of Programs and Actions – Since the adoption of the 1987 *TRPA Regional Plan*, TRPA application of regulations have protected the integrity of riparian and wetland habitat structure (Raumann and Cablk 2008), which in turn has protected riparian and wetland dependent species from direct impacts associated with construction projects or resource management actions. Environmental improvement projects have expanded the extent of, and improved conditions within riparian and wetland areas. Other projects have routed recreational access away from riparian and wetland areas.

Recommendation for Additional Actions – Continue to support riparian and wetland restoration and enhancement projects, including projects that reconnect streams to flood plains and include the removal of excessive conifers that have encroached into riparian areas as a result of fire suppression, and the interruption of natural hydrologic regime.